CONTROL METHOD FOR GAS BURNERS

BACKGROUND OF THE INVENTION

Control methods for gas burners are used for providing a gas-air mixture, i.e. for supplying a gas flow and a combustion air flow to a burner.

In order to ensure an optimum and complete combustion of the fuel, i.e. the gas, within the gas burner, the latter has to be provided with an appropriately balanced gas-air mixture. The ratio between the gas flow and the combustion air flow or between the gas pressure and the combustion air pressure, respectively, is called "composition ratio". However, since the quality of the gas provided by the gas supply varies - the quality of gas is defined by a so-called "Wobbe index" -, the gas-air mixture has to be appropriately varied in dependence on the quality of the gas to ensure an optimum and complete combustion.

For making it possible to consider the quality of the provided gas, the prior art discloses control methods according to which a signal of a sensor is used for adapting the gas-air mixture to different gas qualities. In the control methods according to DE-A-44 33 425, DE 39 37 290 A1 and DE 195 39 568 C1, for instance, an ionization signal of a measuring electrode projecting into the burner flame of the gas burner is used for adapting the gas-air mixture to different gas qualities. In the known control methods according to DE-A-44 33 425, DE 39 37 290 A1 as well as DE 195 39 568 C1, the signal of the sensor is

used over the whole working range or operative range, respectively, of the burner for adapting the gas-air mixture to different gas qualities. Also, in said control methods, the signal of the sensor is used over the whole operating time of the burner.

Since, however, the signal of an ionization sensor does not provide any reliable information on the combustion ratios actually prevailing in the burner when the working loads of the burner are low, the DE 198 24 523 A1 suggests a control method for gas burners in which the signal of the sensor is exclusively used in a range in the vicinity of a full load operation of the burner for adjusting the composition ratio in dependence on the gas quality. As soon as the working state of the burner leaves this range in the vicinity of the full load operation of the burner, the gas-air mixture is controlled while the last determined composition ratio is maintained. However, also the control method according to DE 198 24 523 A1 uses the signal of the sensor over the whole operating time of the burner in so far as the burner is operated in the range in the vicinity of the full load operation of the burner.

BRIEF SUMMARY OF THE INVENTION

The present invention relates to an improved control method for gas burners for providing a gas-air mixture. A signal of a sensor is used for adapting the gas-air mixture to different gas qualities. The signal of the sensor is used for adapting the gas-air mixtures to different gas qualities at certain points in time only. This renders the control independent of aging processes of the sensor.

DETAILED DESCRIPTION OF THE INVENTION

Starting out from this, the present invention is based on the problem of providing an improved control method for gas burners.

In accordance with the invention, the problem is solved by a control method comprising the features of claim 1.

Preferred further developments of the invention result from the subclaims and the description.

The control method for gas burners is used for providing a gas-air mixture for a burner. To this end, a gas flow and a combustion air flow are supplied to the burner. The ratio between gas flow and combustion air flow or the ratio between gas pressure and combustion air pressure, respectively, is called composition ratio.

The combustion process in the burner is supervised by means of a signal supplied by a sensor. The sensor may, for instance, be an ionization sensor, another flame supervision sensor, a gas quality sensor, a flue gas sensor, a combustion gas sensor, or the like. From the sensor signal, information on the combustion process and, thus, on the existing gas quality can be gained.

According to the invention, the signal of the sensor is exclusively used at selected points in time for adapting the gas-air mixture to different gas qualities. This ensures that the control is not adversely affected by aging processes of the sensor.

Preferably, the signal of the sensor is exclusively used immediately after the installation of the sensor for adapting of the gas-air mixture to different gas qualities. In this way, it is ensured that the adaptation of the composition ratio is only effected in the case of new sensors which have not yet been subjected to any aging.

It is also conceivable that the signal of the sensor is exclusively used immediately after the installation of the sensor, immediately after a fresh start of the gas burner and immediately after a reset for adapting the gas-air mixture to different gas qualities. "Fresh start" is to be understood such that this may be a renewed start of the operation after a voltage loss. Since the composition ratio is adapted at selected points in time only, negative influences by aging processes of the sensor can be minimized in this further development of the control method, as well.

It is preferred that the signal of the sensor is used for adapting the gas-air mixture to different gas qualities when stable operating conditions of the gas burner have been reached subsequent to the installation of the sensor, subsequent to a fresh start of the gas burner and/or subsequent to a reset. This improves the precision and the quality of the control.

A further advantageous embodiment of the control method according to the invention consists in that the signal of the sensor is used immediately after the installation of the sensor, immediately after a fresh start of the gas burner and/or immediately after a reset for adapting the gas-air mixture to different gas qualities, that, in dependence on the composition ratio established in this way, a range having an upper limit and a lower limit is

established for the composition ratio of the gas-air mixture, and that, when the composition ratio established by means of the sensor signal leaves said range, the upper limit or the lower limit is used as composition ratio of the gas-air mixture. Of course, when the composition ratio surpasses the upper limit, said upper limit is used as composition ratio and, when it falls below the lower limit, said lower limit is used as composition ratio. In this way, negative influences on the control, caused by aging processes of the sensor can be minimized.

The control method according to the invention is independent of the nature of the sensor or system used. It may be applied in conventional systems, such as described in DE 196 39 487 or also in so-called electronic gas controllers according to WO99/63272 and WO99/63273. Here, express reference shall be made to the disclosure content of WO99/63272 and WO99/63273, and this shall be part of the present description.

The adaptation according to the invention of the gas-air mixture to different gas qualities can also be designated as "calibration".

In this connection it shall also be noted that the method according to the invention can also be applied for modulating gas controllers where, immediately after the installation of the sensor, immediately after a fresh start of the gas burner and/or immediately after a reset, not only the gas-air mixture is adapted to different gas qualities, but also the input signal for the modulating gas controller is optimized at these points in time. In this case, the gas burner is always started with an optimized gas-air mixture and an optimized input